APPENDIX B

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Provisional Patent Application

for

KNOWLEDGE MANAGEMENT AND INFORMATION DEPLOYMENT METHOD AND SYSTEM

INVENTORS

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Summary

Interneer is an engineering software development firm providing an integrated platform for accelerating product design. From product concept to final procurement Interneer cuts engineering costs and time to market by: delivering essential mechanical engineering information and tools through an expert system; by capturing and deploying the valuable knowledge assets of client firms; and, by enabling ongoing collaboration between engineering product/service providers and their markets. Interneer's revenue flows from software license fees, vendor commissions, and ASP offerings.

The Need

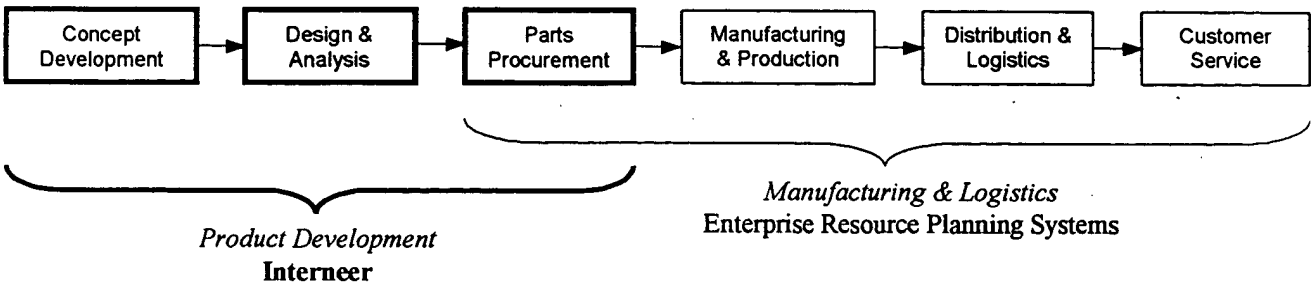
Engineers spend an average of 25 percent of their professional time performing calculations and searching for information such as specifications, equations, material properties, guidelines and data. Vendor identification, parts specification, and procurement further add to the expense and delay of product development. Engineering companies also lack resources to mine knowledge developed internally by their engineers.

The Offering

Interneer cuts engineering costs and product time to market by delivering engineering information, tools and guidance in a timely manner. Interneer's back-end databases will provide key engineering data and equations - retrieved via an intelligent and interactive expert system - instant procurement and outsourcing, and on-line CAD (Computer Aided Design), CAM (Computer Aided Manufacturing) and FEA (Finite Element Analysis) server run applications. In addition, Interneer provides the ability for companies to build their own proprietary knowledge databases that are seamlessly integrated with Interneer's existing databases.

Key Positioning in the Development Product Cycle

Interneer occupies an essential position in the product development cycle by guiding product design and specification. 80 percent of a product's value is determined at this stage. The unique ability to influence parts and vendor selection as engineering designs unfold makes Interneer unusually valuable to vendors. Interneer monetizes parts specification and aggregate procurement through vendor commissions.



Market and Competitive Analysis

Market Profile

Interneer's initial target market is small and medium scale engineering design and manufacturing firms. This includes 54,000 mechanical engineering design and consulting firms. These smaller firms cannot bear the expense of comprehensive engineering information technology infrastructure and design software. Interneer's cost-saving, integrated solution will become indispensable to their product development process.

Summary of Value Proposition

Interneer delivers a comprehensive, integrated product development solution on a single platform. Compelling benefits exist for all stakeholders:

Value for Engineering and Manufacturing Firms

- **Savings** – Lower engineering and manufacturing costs
- **Speed** – Reduce product time to market
- **Coordination** – Connect engineers with marketing, procurement and manufacturing

Value for End-User Engineers

- **Simplicity** – Intuitive, interactive, simple interface, with back-end sophistication
- **Convenience** – Search, point, click, print; No leg-work; Direct link to suppliers
- **Access** – To project and team information anywhere

Value for Part and Component Vendors

- **Access** – Direct, convenient access to engineers with purchasing authority
- **Market Lock-in** – Create ongoing returns by locking their parts into products at the point of design

The Product

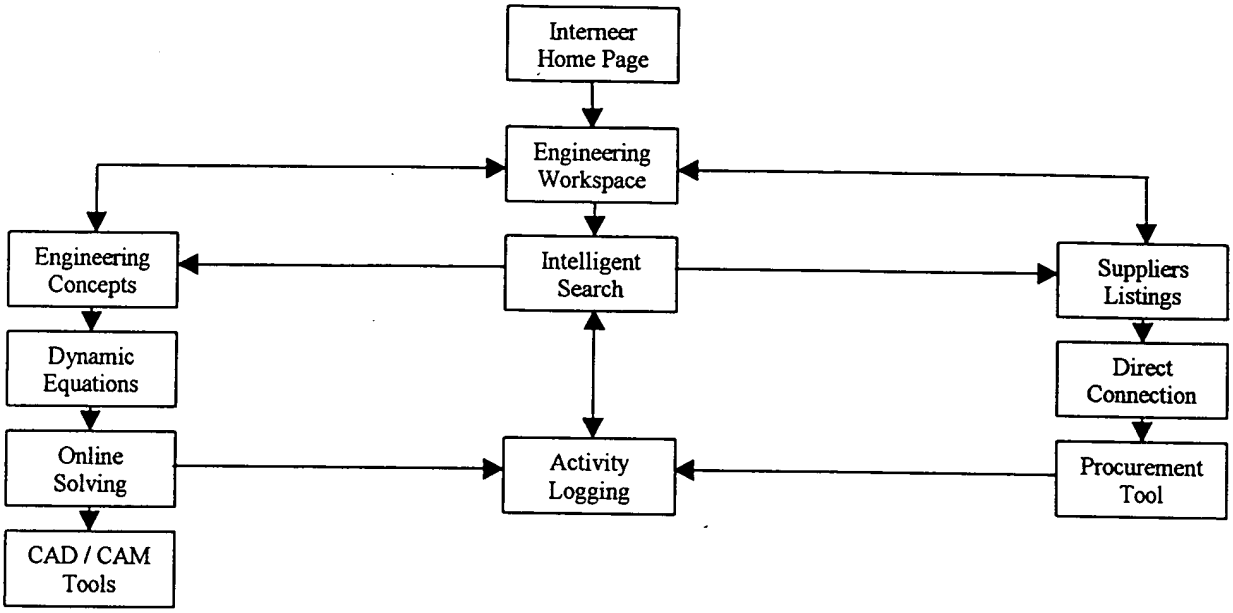
Product Description

Interneer delivers Internet Aided Design (IAD) and Internet Aided Engineering (IAE) software and will later include Internet Aided Manufacturing (IAM). This software allows engineers to search for and interact with information and data quickly and efficiently, allows them to solve technical problems online, and connects them directly with manufacturers and vendors. Subscription paying engineers are provided access to the most widely used engineering information, equations and data (retrieved via an intelligent and interactive search engine), problem solving tools, procurement and outsourcing resources, CAD / CAM / FEA server run applications, and educational resources.

Site Navigation

Figure 2.1 shows the Interneer Process Diagram. The user logs in to their personalized engineering workspace. Once there, users can search for engineering concepts, references and research materials, manufacturers, and vendors of either off-the-shelf products or custom parts. They also have access to online CAD/CAM ASP tools; available with a simple click. The software will be composed of 4 main sections described in the following subsections.

Figure 2.1 – Product Process Diagram



Intelligent Search Engine

The search engine is knowledge and meaning based to simplify and expedite information retrieval. For example, consider an engineer requesting information to answer the question, "What oil should I use to dampen gearbox noise?" Interneer then responds with a number of clarifying choices: "Do you want to improve gearbox performance? Do you want to reduce gearbox noise?" Etc. The user can also be provided with links to information on gears within the site as well as links to manufacturers of gears and the gear yellow pages depending on their search specifications.

In addition to these concept (question/answer) types of searches, users will be able to enter keywords that will be interpreted by the expert system. They will then be guided to the best solution via multiple layers of dropdown lists. These lists are driven by knowledge created both by Interneer and the users themselves.

Interactive and Concise Content with Problem Solving Tools

Interneer will have a database of the most widely used equations, data and charts used by our customers. Topics will be compiled from surveys conducted on working engineers and will include:

- **Technical content** – Concise and structured and offered in layers of increasing depth
- **Problem solving tools** - Interactive equations and explanations of equations
- **User interactivity** – For example, viewing graph of particle velocity versus time is interactive so that new data can be generated in real-time if time axis changed to distance
- **ASP resources** – CAD, CAM or FEA
- **Graphical Resources** – Charts / graphs and Tables of various data such as material properties
- **Tables and graphs** – Categorized and searchable by keywords
- **Material properties data** – Selected from drop down lists in our database or from manually entered data if not available in the database
- **Units** – Selected dynamically and for each separate equation variable

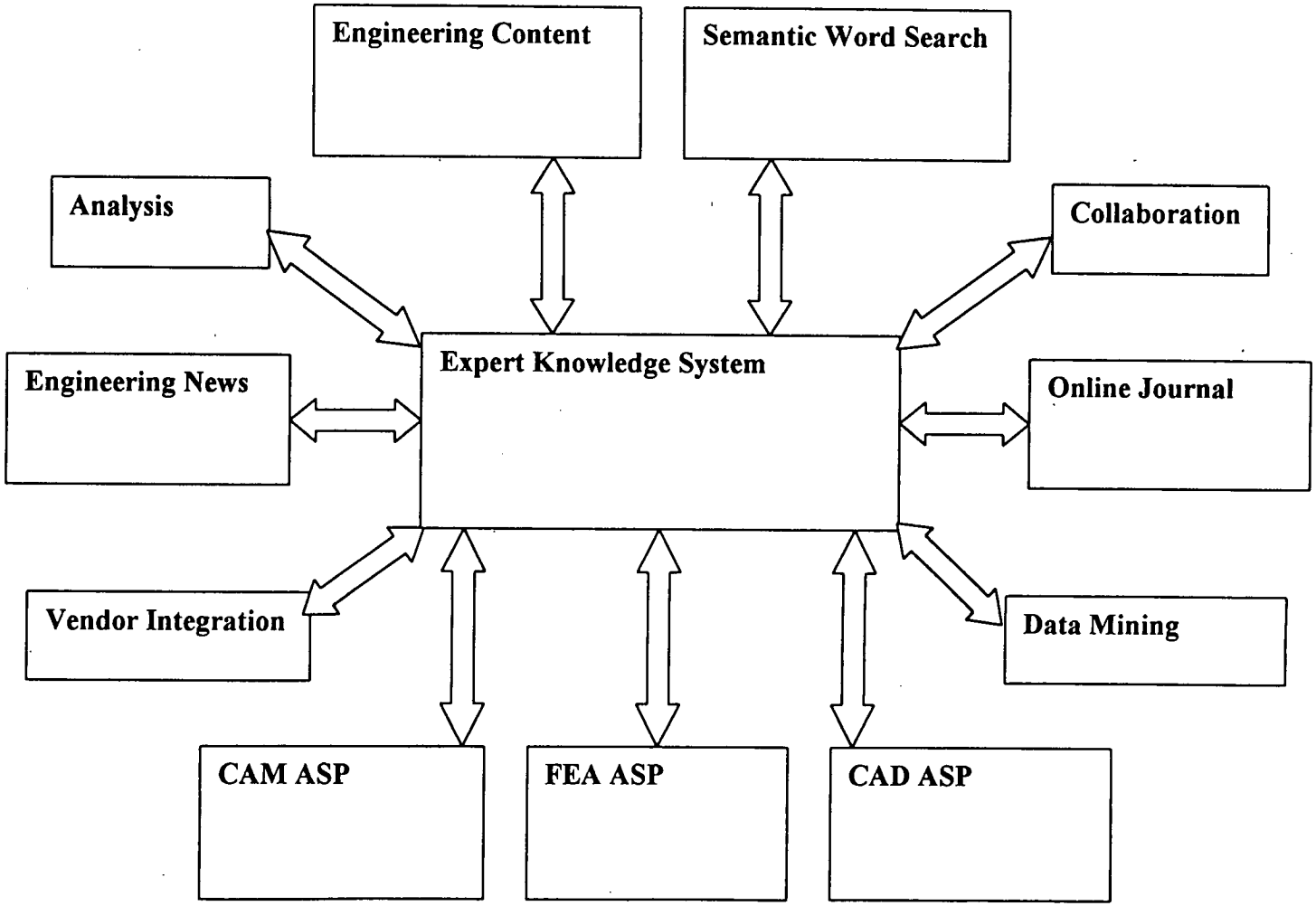
Users will also be able to compile their own knowledge by entering information into an online knowledge management template. This information will be available exclusively to them, but will be seamlessly integrated with Interneer's existing knowledge base, after being validated through the company's review/approval process. This allows companies to build their own tools and resources and to organize the cumulated knowledge of their engineers so that it can be passed on to new hires and current employees simply and efficiently. Experienced engineers will then be relieved to some extent from training and supervision, thus freeing up time for more meaningful work.

Direct Access to Manufacturers / Vendors / Contractors

Upon designing and specifying needed parts, engineers are provided direct access to the providers of these parts.

As equations are solved online, lists of links to manufacturers of the designed parts are presented along with detailed information, availability / lead-time and cost. Users can purchase needed parts on Interneer and directly communicate between their procurement agent and the provider. With one simple click, an email can be sent to the company procurement agent with detailed information on the part along with ordering information, thus simplifying the job of the procurement agent.

Figure 2.2 – Product Family Diagram



User Activity Log

This feature tracks users' daily work activities and is an essential time saving tool, given that engineers often refer to their previous work. Elements to the log include

- **Daily Activities** – Online dynamic tracking application that stores user activities as they solve problems
- **Control** – Users can elect to save instances of their work in real-time or opt to automatically have it logged
- **Historical data** – Log keeps track of pages viewed, equations utilized, data inputted into equations, manufacturers references, parts bought, etc.
- **Stickiness** – Log is non-transferable or downloadable and is stored on the Interneer servers

Server Run Applications

Interneer will provide Computer Aided Design (CAD), Finite Elements and Computer Aided Manufacturing (CAM) tools online, available on a pay per use basis. These tools will complete the package making Interneer the complete solution for engineers.

Figure 2.2 shows the Interneer Product Family Diagram detailing the various components that make up the Interneer product and their respective connections.

Launch

The Interneer website is being developed and deployed in three stages as outlined in Table 2.1. The following subsections describe in detail the process.

Table 2.1 – Interneer Website Deployment

Release Version	Description / Enhancement
Beta Version	• Overall Planning and Design of Website • Intelligent Search Engine • Interactive and Concise Content
Version 1	• Direct Access to Manufacturing / Vendors / Contractors • User Activity Log
Version 2	• CAD / CAM / FEA ASP

Beta Release

Planning and Design of Website

Design of the Interneer architecture and backend infrastructure is critical at this stage to ensure scalability and robustness. Interneer therefore intends to team with firms with a technical partner or developer with proven success and experience in designing sophisticated backend solutions.

Intelligent Search Engine

Interneer will initially license a knowledge-based search engine such as Ask Jeeves or Excalibur and customize it to fit the engineering content and topics.

Interactive and Concise Content

Interneer is developing exclusive partnerships with engineering content providers such as Industrial Press Inc. Selection of the content has been based on results of industry research among working engineers. Additional effort is underway to begin locking-in additional content partnerships. This courting process is being arranged through Interneer's contact base.

Templates are being created to ease the production of the interactive content. Equations will be stored in a database in a manner that ensures that templates can be used when developing the website. This also reduces development and implementation time.

Interneer Version 1

Direct access and linking to manufacturers / vendors / contractors

Interneer will access vendor parts by initially partnering with the largest and most comprehensive vendors. This strategy will allow Interneer to offer tremendous variety immediately. Interneer will also consider cooperating with MySimon.com or BestBookBuys.com to provide comparison-shopping online. Interneer will also pursue partnerships with GlobalSpec.com, which has an established base of manufacturers and vendors in their database.

User activity log

Interneer stores user activities and keeps track of all transactions performed on website. The data is stored on the Interneer server or within a corporate intranet.

Interneer Version 2

CAD / CAM / FEA ASP

Interneer will pursue partnerships with engineering software providers such as SolidWorks for CAD software, SurfCAM for CAM software and CosmosWorks for FEA software. The potential partner

will be investigated to ensure that the software is transferable to the web to be used as an ASP.

Technology Requirements

Interneer's back end infrastructure and website will be developed using a three-tiered approach. To ensure speed of development of the Beta Site, Interneer will be coded in tier 1 using IIS, Active Server Pages technology and SQL server database. Multiple servers will be deployed in this phase. Load balancing applications such as Big IP will be used. This is crucial to ensure that the site is protected from crashes. The 12 servers are:

- 3 powerful computational servers that handle all online calculation requests including equation results, graphical interactivity and so on. The three servers will share the load ensuring timely responses. These will be hosted with an Internet Web Server Hosting company such as Exodus or Above.net.
- 2 web servers will be used to serve dynamic web pages and for traffic. Microsoft IIS web server running on NT or Windows 2000 platforms will be used. Again, the two servers will be used to balance load. These will be hosted with an Internet Web Server Hosting company such as Exodus or Above.net.
- 2 robust database servers will be used to store and retrieve content and equations. SQL server will be used. The two servers will balance the load. These will be hosted with an Internet Web Server Hosting company such as Exodus or Above.net.
- 3 internal servers (1 computational, 1 web and 1 database) will be used internally for development.
- 2 internal file servers for day-to-day operations and file sharing.

Tier 2 will focus on transferring the Active Server Pages code to COM objects and Active X components. This will ensure faster processing and page serving as traffic to Interneer builds up. Tier 2 implementation will start in the fourth month and correspond with Version 2 release.

Tier 3 will focus on removing bottlenecks. The code will be modified as necessary to ensure both horizontal and vertical scalability and to optimize the technology and add robustness. During this phase, additional servers will be deployed as needed for scalability.

Industry

Industry Assessment

Targeting Fragmented Engineering Business Creates a Favorable Power Balance

Overall 650,000 manufacturers operate in the United States. The vast majority of these are small and medium sized. Interneer's target market is the small and medium (1 to 1000 employees, 1 to 30 engineers) design or manufacturing firm. Small and medium mechanical design firms alone represent 54,000 potential customer companies. The target market is fragmented and collectively has little

leverage to influence prices or demand product features. These customers will have diverse specific needs as well as many common ones. It is Interneer's challenge to create a product that has wide appeal yet compelling value to the target customer. Interneer's advantage is that small firms do not have the financial or technical assets to develop a robust and comprehensive internal engineering portal, nor do they have the disposable income to purchase the array of software packages Interneer will provide. These customers do not have collaborative power to obtain price reductions or employee base to receive significant volume discounts. Interneer provides a cost effective integrated solution for which there is no current, integrated substitute and customers have limited leverage to force price concessions or demand unique product innovation.

Interneer's Wide Market Access Provides Leverage Over Suppliers

Interneer's suppliers are a combination of product suppliers (vendors), software companies (sales and rental), specialized software developers (to operate proprietary software to run the site) and reference materials (texts, specs). Product suppliers have limited power. Many of the vendors of products for mechanical engineering offer commodity goods, and are therefore replaceable by others. Interneer links product suppliers to end users via a search feature and targeted marketing. Product suppliers compensate Interneer for click-throughs and commissions on sales. Initially, product suppliers will have power over Interneer as site traffic and market penetration are low. However, as Interneer generates a larger subscriber base, Interneer will be able to command more favorable commission rates as the impact of not being represented as an Interneer vendor will increase. Software suppliers will have the most power over Interneer as they provide unique products that are demanded by customers. There are only a handful of credible software packages for design and analysis. With such limited choices, the suppliers have the upper hand and can obtain favorable terms. However, by offering superior access to engineers, Interneer will regain advantage by locking up the market.

Head-off Competition Through Exclusive Partnerships and Aggressive Marketing

No single supplier provides an integrated service and commands significant market share. As stated, Interneer's goal is to offer integrated service and do it first. However, it is expected that new entrants will jump in if the market opportunity looks good enough. Before new competition emerges, Interneer will seek exclusive partnerships with key information providers. When competition emerges, Interneer will execute aggressive marketing and branding strategies to maintain control of market share. Interneer is expecting competition and it values competition as the medium by which Interneer's superior product and service differentiation will be demonstrated.

Lock-Up Content and Adapt to New Competition

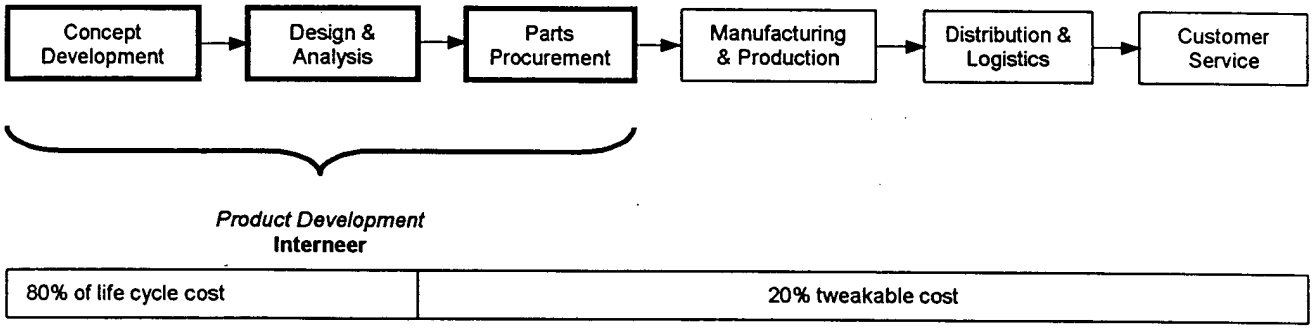
It is the staying power of the existing products that we are trying to displace (Books, Manuals, Catalogues, etc...), and the existing provider's ability to adapt that is a major threat to Interneer. There is also the credible threat of new entrants offering similar products. Interneer again will move quickly to lock up key assets, such as existing reference texts (i.e. Mark's Handbook) and forging alliances

with key software sources (i.e. AutoDesk), to prevent competitors from establishing a strong brand. And finally, compelling new offerings may be put forward by our competition. In response we will adapt by mimicking, licensing, partnering, or improve upon that offering.

Figure 3.1 shows a typical Product Life Cycle diagram and the positioning of Interneer and its competitors in the full cycle. It is clear from the figure that Interneer is positioned to cater to an underserved section of the life cycle diagram. This Product Development stage freezes 80% of the cost of a product. After development and procurement, only 20% of the cost of the product can be effected. Interneer focuses on the former stage, directly reducing costs and streamlining latter stages of the cycle. Interneer will eventually expand along the product value chain to provide services at all stages. Table 3.1 displays a summary of Interneer's features and how they compare to its direct and indirect competitors.

The next sections outline four of Interneer's major competitors. A more extensive list of direct and indirect competitors is contained in the appendix. A brief description of each company's offerings, management team and revenue model is presented. In addition, competitors' weaknesses and differentiation from Interneer are outlined.

Figure 3.1 – Product Life Cycle



Distinguishing Features of Interneer

Interneer distinguishes itself and its services from its competitors in a number of ways including partnerships, marketing and image, features, technology, content, functionality, service, speed and efficiency.

In addition, Interneer is seeking, and will continue to seek, technology and business method patents for all major innovations as they are developed thus erecting barriers to entry. Due to the agility and nature of a startup company, Interneer is more geared to adjust to marketplace needs in contrast to established competitors.

Aggressive Marketing

- **Major Marketing Campaign** – Interneer will undertake a marketing campaign that is comparable in size to consumer market branding, targeting engineers at all levels and utilizing traditional and untraditional methods of advertising. The campaign will be far-reaching and highly creative especially in universities.
- **Indispensable Tool for Engineers** – Interneer will be branded heavily as the choice tool for engineers. The company will be branded as indispensable to engineering students and young engineers.
- **Technical Competence Image** – Interneer will project an image of technical competence and high-tech. This will attract both the young engineer who is looking for the cutting-edge high-tech product and the seasoned engineer who is looking for competence and expertise.
- **Exciting** – Interneer will distinguish itself further by projecting the brand of quality, speed, efficiency, organization, sophistication, freshness and excitement.

Site Content Superiority and Features

- **Integration of Resources** – Interneer will combine the most widely used tools and data for engineers. The information will be provided in the most efficient way based on market research and focus studies conducted on working engineers. The main focus is to save engineers time.
- **Daily Activity Log** – Interneer will track and log engineers' work on the site and provide them the ability to retrieve their work at a future time. This feature will ensure that engineers remain loyal to Interneer since this log can only be accessed from within their user account on Interneer.
- **Continuous Site Updates** – Interneer will continuously update its tools, enhance its content, and introduce new services, ensuring its usefulness to customers and competitiveness in the marketplace.

Functionality

- **Interactive Content** – Interneer will provide its customers much more than the information found on competing sites: Engineers will be able to interact with information in a manner conducive to increasing the efficiency of the engineering process. This means that engineers will be able to learn faster, have shorter design and analysis cycles, and ultimately decrease the time to market of their products.
- **Powerful Controls** – Interneer will provide multiple control and shortcut features that will tailor to more advanced users and will generate a sort of "cult following" who know the ins and outs of the website.
- **One-Stop Destination Site** – Interneer will truly be the one-stop destination site for engineers since it will link them directly to the manufacturers and vendors whose parts and services they seek. The engineer who is seeking answers to a problem will also conveniently find a link to a manufacturer, contractor or vendor during his/her online problem solving session.

Operations Speed and Efficiency

- **Strategic Alliances** – Interneer will seek to form strategic alliances early on with major publishing houses, engineering service providers, manufacturers, and engineering software companies to ensure the best resources for users.
- **Adaptable Website** – Interneer will design the site to quickly adapt to technology changes. This will better serve customers by taking full advantage of the Internet and its potential.
- **Extensive Licensing** – Interneer will seek to license most of its content needs rather than recreate it in order to produce fast result and updates. Whenever possible, we will not 'reinvent the wheel'.

Customer Service

- **Excellent Customer Service** – Interneer will provide excellent customer service along with real-time continuous updates of the content to ensure quality service differentiating Interneer from its competitors.
- **Real-time Discussions with Customers** – Interneer will utilize the latest available technologies to provide online real-time customer service attendants for users.

Marketing

Marketing Analysis

Market Overview

Interneer's market is defined and focused. Small and medium scale mechanical engineering and manufacturing firms (see market segments below) benefit most from Interneer's integrated engineering platform. This is because they lack the infrastructure and resources to implement a similar offering. This market is also fragmented, competitive, and squeezed by global competition. Speed and efficiency are critical to survival, and Interneer meets those companies' needs directly.

Targeted, intensive, marketing and media relations are central to Interneer's business strategy. Many emerging competitor firms, with their technical management, fail to initiate effective, penetrating marketing campaigns. Interneer will focus on building its brand identity – speed, simplicity, innovation, and technical competence – and distinguishing its product as vital and unique.

Revenue Sources

Most of Interneer's revenues are derived from subscription fees paid by small and medium sized mechanical engineering companies. Interneer is targeting smaller firms because they lack the information technology or infrastructure to implement their own portal solution. Interneer plans to automate much of the account activation process by placing it on the web, reducing Interneer's transaction costs.

Growth Potential

The growth of an Internet industry is inherently difficult to measure. However, InPart, an Internet engineering service company with a very similar market to Interneer provides a database of CAD standard parts and associated vendors, and has maintained a growth rate of over 400% over the first two years of operation, a rate which Interneer believes is achievable in its market.

Customer Profile

Target Customers

Our customers typically may consist of small to medium sized high tech firms (<1000 employees). The largest portions of these firms are involved in the manufacturing industries.

Early Adopter Profile

Early adopters of Interneer include young engineers, consultants, and students. Firms in competitive markets are especially interested in gaining competitive advantages. This remains true for companies involved in cutting edge technologies in general. Those who are comfortable with the Internet and use it on a daily basis will find working online painless and even necessary. Also, mid-sized companies are more willing to take a risk on new products, whereas smaller companies are more reluctant and will want others to test first.

User Profile

Engineers

Engineers apply the theories and principles of science and mathematics to research and develop economical solutions to practical technical problems. Their work is the link between scientific discovery and commercial application.

Likes & Needs

Engineers need to continually update their knowledge base in order to maintain value to their employers. This can be achieved through formal education, research, work, interaction with others, etc. With a broad knowledge base, engineers are stepping up and taking on more responsibility, thus increasing productivity as well as furthering their career. Engineers require challenging and exciting work.

Mechanical Engineers: a Broad Skill Set

Mechanical engineering is the broadest engineering discipline, extending across many interdependent specialties. More and more, the boundaries between mechanical engineering and other disciplines are being blurred by the development of new technologies, new techniques, new knowledge, and new

lifestyles. The field is predominantly composed of white males and in fact has the smallest percentage of women of all engineering fields. In all countries, the mechanical engineering profession continues to draw its members mainly from traditional pools that are, in many cases, numerically dwindling.

Other Target Users

Interneer's product appeals to a variety of users beyond mechanical engineers. In particular, technicians who work in the same industries alongside engineers will find our product especially useful. This certainly isn't to say that these are the only potential additional users. Others such as scientists, purchasing agents, and anyone interested in or involved in engineering definitely have use of the services we provide.

Primary Market Research

Interneer continually mines knowledge and experience from practicing engineers to learn more about the state of the engineering profession. Focus groups composed of practicing engineers have provided a great deal of insight to engineering as well as validation of the Interneer platform. Additionally, a copy of a recent survey and tables of results are presented in the appendix. In this survey, twenty-five engineers with different education levels from various companies and engineering disciplines have participated in the survey thus far. Levels of experience of these engineers range from junior engineer to executive. The survey is designed to discover the wants and needs of today's working engineer.

One question determined how engineers utilize their time at work. As expected, most engineers spend a large portion of their time at work (41%) searching for information, performing calculations and procuring products and services. Interneer's goal is to simplify, document, and interconnect these activities by creating the most sophisticated engineering solution platform in the world.

Time Spent on Various Tasks by Engineers

Administration	13%
Searching for information	13%
Performing calculations	12%
Procuring products and services	16%
Other (meetings, etc.)	46%

Interneer will use the Internet to provide needed information and tools for the end-user. Therefore, the survey contains questions about online usage and types of connections available to engineers. Respondents spent anywhere from 2 to 30 hours per week online and averaged 18 hours. Furthermore, the majority of respondents claimed very high Internet access connection (DSL and Higher) at work.

Percentage of Respondents Using the Internet for Various Activities

Purchase research	52%
Competitor research	44%
Research new technology	68%
Email	88%

In a related question, participants are asked to give information about specific engineering resource web sites they frequent to find information. The majority could not name a specific site. This was expected for two reasons: first being the clear absence of such web sites, second being the lack of awareness on the part of engineers. Interneer solves this problem by creating an online engineering resource and by making sure through branding, advertising, and education that engineers are aware the site exists.

A major product offering from Interneer is the online log: a documentation tool for users and organizations to document their work. The survey contains a question about how often practicing engineers reference work they have done in the past. The responses thus far are overwhelmingly convincing: every engineer surveyed claimed to regularly reference work they have done in the past.

Interneer's product offering also includes access to information typically contained in engineering handbooks used by the profession today. Thus, a question on how often engineers reference engineering handbooks is included in the survey. The results are evenly distributed. The reason for the distribution is the varied function and responsibility level of the participants. Most engineers claimed to have frequent need for the handbooks, whereas most high level engineers or executives referenced the information only occasionally.

Number & Frequency of Respondents Use of Engineering Handbooks

Not often	7
Often	10
Very often	8

The last survey question asks how much engineers are willing to pay for engineering services that increase efficiency and productivity. Results show a monthly range per employee as low as $50 and as high as $2000. One major factor affecting the amount participants are willing to pay is their level of responsibility. Most engineers are willing to pay no more than $100 for Interneer, whereas leaders and the executives are willing to pay upwards of $2000 per month, provided certain tangible results are

accomplished with Interneer as the provider. This is encouraging considering those leaders and executives are far more likely to be the ones approving the purchase of an Interneer subscription.

Purchasing Agent

Purchaser Profile

The purchasing agent is typically a managerial entity consisting of engineering managers. However, in certain cases group leaders and project managers act in this capacity. Engineering managers of all types are normally technical engineers with management background. Purchasers are usually responsible for requesting funding for projects and department activities. Enhancing work efficiency, increasing productivity, and ensuring project completion are few of their assessment metrics. Interneer helps the purchaser meet goals by providing services that enhance efficiency, improve productivity, and expedite project delivery.

Interneer's Compelling Value

Almost every purchasing agent's business measurement is enhanced by Interneer's services. The argument for increased productivity is a simple one since it has a direct effect on the bottom line: cost and speed to market. Improving the engineer's productivity reduces budgetary constraints. In addition, knowledge management is a substantial side benefit. Interneer makes possible not only the generation of ideas and results, but also the documentation of the newly found knowledge. Much money gets wasted when knowledge in an organization remains tacit or departs with the employees. Although Interneer does not claim that all knowledge generated by its services is codified, however having all the work produced by the organization documented and organized, offers a tremendous advantage, and provides access to previously stranded investment.

Increasing productivity and knowledge management are not the only benefits and tools Interneer offers the purchasing agent. Centralized billing is another major advantage. Interneer provides all needed resources required to complete an engineering project. From vendor selection to part procurement, Interneer bills and centralizes every component of the project. The purchasing agent can of course setup a business account with Interneer and allow its engineers to use the account to acquire the needed services.

The Purchase Decision

The Decision Maker

The purchasing decision may rest with one or more individuals in an engineering firm and may require few to numerous approvals. The manager of a small firm may simply make the decision, whereas in large firms, the approval may require several steps of approval.

The Purchase Basis

The decision for purchasing will be based on an evaluation of the benefits and value from utilizing Interneer as well as an examination of the alternative products, such as competing Internet sites and traditional sources.

Customer Perks

Perks for reinforcing customer loyalty include discounts for subscriptions, engineering services, and extended contract deals as well as discounts for recommending Interneer to others.

Product Branding

Interneer will be branded as a 'cool' site by associating it with or entering into agreements with products that have an appealing image engineers can identify with. Interneer will also physically advertise on engineering-related projects that receive mass-media attention and also by distributing free Interneer promotional items.

Value Proposition

To the Engineer

Interneer offers many tangible benefits to the practicing engineer and hence to the engineering firm. Some of these are listed here.

- **Increases productivity** – all technical and manufacturing resources are a "point and click" away, desks do not need to be cluttered with technical books and references
- **Increased access speed** – allows engineers to perform searches and obtain results quicker than traditional sources and less extensive, competitive web sites
- **Reliability** – engineers will be assured of Interneer's reliability, and will not need to spend time double-checking calculations and data, as with conventional sources
- **Up-to-the-minute information** – the engineer will be assured that he/she is receiving state-of-the-art information and resources
- **Tracks resource usage** – online logging maintains a daily log of Interneer usage, allowing for better self-management
- **Expert help** – through Interneer's chat rooms and staff, expert help is always available

To the Procurement Agent

Interneer goes well beyond assisting in the efficiency of the engineering process, it adds compelling value to the procurement agent as well. Some benefits to procurement are listed here.

- **Simplified billing** – will have only one invoice to deal with from Interneer, rather than numerous invoices from multiple sources; will not have to spend time tracking invoices, writing checks
- **No catalogs** – no need to stock and distribute manufacturer's catalogs
- **Easy part ordering** – no need to do "guess work" on an engineer's request for equipment or parts

– the engineer will know exactly want they want

- **Procurement record** – Interneer will provide a record of all items purchased through its "Yellow Pages" and manufacturer lists that will aid the procurement agent in inventory procedures
- **Eliminate software** – Interneer replaces the need and hassle of purchasing numerous engineering software programs
- **Automatically upgraded** – Interneer continually upgrades, whereas with software and reference data, procurement agents have to deal with products that require incessant upgrades
- **No book / magazine subscriptions** – do not have to spend time maintaining subscriptions for engineering resource data and standards

To Management

Managers ultimately want to save money and develop superior products. Interneer makes it easy for them to justify the purchase of its product.

- **Saves money** – reduces project costs by minimizing engineering time and maximizing efficiency
- **One-time resource solution** – provides managers with an absolute solution to the technical requirements of their engineers
- **Instills confidence** – managers can be confident of the quality and integrity of engineering work that is being performed with the aid of Interneer
- **Saves on purchases** – by using Interneer's "Yellow Pages," managers can be assured they are receiving competitive pricing for their purchases
- **Maximizes markets** – Interneer's "Yellow Pages" will allow managers to tap into new markets and gain customers and increase company profits
- **Saves time** – minimizes management's involvement in approving engineering related purchases
- **Good buy** – Interneer will be an attractive investment – far cheaper than purchasing numerous software packages, site licenses, and technical reference books

Distribution Strategy

Gaining access to Interneer's product and services is as easy as typing in Interneer's URL, and entering company information. There is no need to stock bulky books and boxes filled with outdated software. Interneer is updated in real time, and it provides customers access any time and from anywhere. An engineer from California traveling on business in New York merely has to access the Internet, log on to their personal web page, and then they have access to the full complement of Interneer's services and any previous data they may have stored.

Although Interneer is available online and will aggressively advertise, it must still depend on traditional distribution strategies to get the word out. Interneer will employ resellers to go into the field and get new customers to log on and to sign up. In addition, potential customers will be able to go the reseller's site for a demonstration, and then be able to sign up then and there at the conclusion of

the demo. Interneer will also have stations available at major conferences for new customers to sign up on or to test the product.

Promotion

Market Penetration Strategy

To establish its brand and market presence, Interneer is launching a promotional program which includes advertising (online, journals, etc.), partnering with other companies that provide products and services to engineers, sponsoring events and competitions and giving free gifts marked with the Interneer Logo. Interneer will discount subscriptions for the first six months after Version 1 is launched. As the user base grows, Interneer will expand its diverse portfolio of products and service offerings.

Advertising

Interneer will use traditional and nontraditional media to establish its brand.

- **Endorsements** – obtain from recognized organizations such as ASME, NASA, SAE, AIAG, IEEE
- **Print ads** – place ads in trade journals and magazines, most notably Mechanical Engineering Magazine
- **Internet** – banners and links will be placed on the most popular engineering related web sites such as asme.org, manufacturing.net, and so-called vertical engineering portals such as icrank.com

Co-Promotion Partners

Interneer will partner with other companies that provide products and services to engineers. The goal is to continually add value to the site and provide engineers with an ever-increasing collection of resources.

- **Software companies** – form strategic partnerships with Solidworks, MatLab, ProEngineer, Autodesk to name a few
- **Publishing firms** – either license content from or partner with McGraw Hill, Industrial Press, Reed Elsevier, etc.
- **Equipment manufacturers** – solicit sponsorships from Hewlett Packard, Agilent, Palm, Dell, etc.
- **Resellers** – use reselling channels to distribute products and outsource help in exchange for commission

Trade Shows and Conferences

Participating in trade shows and conferences is an integral part of Interneer's promotional strategy. Interneer will automatically have a presence in many of the largest mechanical engineering related conferences by advertising in Mechanical Engineering Magazine. That is not to say that an ad in a magazine can replace a personal appearance. Interneer will attend major events. Some of these include Comdex, ASME Conference, Westech, Design Engineering and Manufacturing Solutions, and Manufacturing Week.

Service

Service is key to Interneer's success, and the Interneer Team is dedicated to developing and deploying the best customer service in the industry. This level of commitment will be achieved through 24-hour live phone help. This service will be unique in that the people answering the phones will not be temp agency hires, but rather the engineers who helped to create the site content in the first place. Interneer will rotate its engineering staff through the service department in order to ensure that each employee has first hand knowledge of customer needs and wants and feels personally connected to the customers. This level of interaction with Interneer's customers will also ensure that tools are constantly improved or added to address customer needs.

Service will also be outsourced to the VARs of Interneer's product. The reseller will act as a salesperson and help expert and will be trained by Interneer's engineering staff. Many subscriptions will be sold online without the need for the reseller, however these customers will still be initially routed to the resellers in their area. In order to incentivize the reseller, Interneer offers a commission, albeit smaller than if they sold it themselves, for every subscription sold in the reseller's region. The value added resellers will also provide important feedback from customers. Interneer will constantly improve and add new tools to address customer needs.

Upgrades

All of Interneer's products are offered online and therefore there is no need for sending periodic updates to customers. All products are updated from time to time directly on the site thus saving distribution costs for Interneer and saving the customers the hassle of updating software. Interneer plans to continuously innovate and add new services in order to provide our customers with the best possible solutions available. From time to time additional premium services will be made available to customers at an added cost.

Pricing

Interneer, Inc. obtains revenue from three distinct sources (the fee structure is provided in the Appendix),

- Customers (subscribers)
- Suppliers (vendors)
- Advertisers

Engineering Design Tools, Guidance, and Information

The beta and first generation of Interneer focus on creating a clear, focused value for engineers – tools, guidance, and information. This value can be quantified as a net savings of $ 15,200 per engineer.

Subscribers (engineers and their firms) pay either a quarterly fee of $ 1,000 / user or an annual fee of $ 4,000 / user. Firms purchasing 10 to 19 subscriptions will receive a 20% discount, and those purchasing 20 or more will get a 30% discount. This fee grants the user access to Interneer's design tools, online resource databases, vendor referral and material procurement, career placement, and consultants. Subscribers have the right to purchase additional for-fee services, such as software rental. CAD/CAM/FEA software will be rented hourly, daily, or weekly, as dictated by customer needs, and will be tier priced depending on the complexity/power of the software anywhere from $ 25 / hour to $ 30 / hour.

Vendor Referral Commissions

Suppliers are vendors of any kind – material, software, contractors, etc. Supplier links are located both in Interneer's searchable Yellow Pages and in targeted segments of the website. Interneer charges a commission for transactions occurring as a result of subscribers linking to vendors. Generic Yellow Pages click-through commissions are lower than targeted link click-through commissions and are determined on a case-by-case basis. In general, commodity low margin/price goods and services will generate 1-3% commissions and specialized high margin/price goods and services will generate 3-10% commissions. These values are based on current e-commerce transaction models. In addition to commission revenue, suppliers also pay for premium search placement.

Operations

Billing and Accounts Receivable

Interneer will maximize its cash position through an incentive billing structure and proactive collection of accounts receivable.

The Subscription Customer

Customers are billed monthly based on a subscription contract, although a 5% discount will be offered to those companies that pay for the full year's subscription in advance. Billing is not done in advance of the next billing date and the invoice date is the renewal date. Payments methods will offer incentives for using electronic checks (a 1.5% discount which reflects a portion of Interneer's savings in accounting costs) and 1.5% savings for payment within 30 days. Interneer makes payment as easy as possible for its customers in order to reduce bad debt expenses and improve its cash position. Major credit cards, company checks, or money orders are also accepted. Payment information can be updated via the Internet or by calling Interneer's customer service line, or by e-mail.

Billing statements will be generated each business day for the previous day's renewal and on the generation date a notification will be sent by e-mail to subscription customers 3 to 4 days before the next billing cycle. The bill will be held open for this time to process any changes requested by the

customer and will then be closed. The account billing frequency and mode of payment can be changed on the website or by replying to the automatic e-mail notification. Subscription rates will implicitly internalize the fees for check authorization services (provided by Telecheck Service and Equifax) and the handling fee that financial institutions require for reimbursing credit card charges. The cost for these services will average out over time to be 3% for each transaction.

The Advertisers:

Interneer will also maximize cash on hand in collecting fees form Web advertisers. Generally, the ads will be paid for on a CPM (cost per thousand impressions) basis – for every thousand times a viewer loads the Web page containing the ad banner, the advertiser will pay Interneer a fee. Because of the high-value, high concentration market of engineers Interneer delivers, this CPM fee rate will be competitive with such advertising leaders as Yahoo!, AOL, and NetZero, which is $7 to $10. This fee is a competitive offering for the advertiser as compared to CPM rates for specialized Web sites such as Microsoft Carpoint where the CPM rate is $47.

Paying Suppliers

Interneer will maximize available cash by negotiating lines of credit with suppliers. Invoices will be paid at the end of the allowable grace period, after they have been received and verified. Interneer will take advantage of cost-saving incentives when invoices offer a discount when bills are paid on-time (for example: a 3% savings for payment within 30 days).

Aside from the minor use of suppliers for administrative needs, Interneer's main suppliers will include those that provide information services (such as technical data or engineering standards). Interneer will pay suppliers through an electronic accounting and check transfer system to lower accounting and transaction costs.

Human Resource Management

Interneer operates with a flat, decentralized, team-based management structure, to encourage initiative and foster speed. The company's main units are: Database/Technical Services, Business Development, Marketing and Promotion, Finance, Engineering Services, and Administration (Fiscal, Human Resources, etc.). Teams will be fluid, change by project, and be crosscutting. Each unit will have it's own management structure, with its own director.

Warranties & Returns

Any downtime of Interneer's services due to Interneer's actions will result in a customer's account being credited accordingly. In all customer contracts, Interneer is explicitly held harmless for losses

associated with disruption or downtime of Interneer.

Interneer will maintain a back-up/disaster recovery system in case of such situations as a server crash. This will back up all work every 10 seconds using software that identifies and saves only incremental changes in the client's work – a protocol that requires limited bandwidth. However, the customer's data is his/her responsibility and Interneer strongly encourages the use of the built-in, back-up utilities to enable quick data recovery for the customer and avoid the loss of data.

Monitoring & Budget Control

Interneer will maintain strict financial controls to respond rapidly to issues and opportunities as they arise, and to provide critical information to management. This will be accomplished by structuring the company with profit centers by division, starting in the second year of operation. (During the first year, the firm will be small, employees will see their direct influence on the bottom line, and transaction efficiency will be paramount.) Each section will have its own accounting system, where all external and internal transactions will be recorded in real time. All sectional records will be sent to employees and managers, and consolidated into a single accounting system. Using this method of financial control, Interneer will be able to closely monitor progress towards its financial objectives, avoid financial crises, and identify opportunities for improvement in real-time. Interneer will also be able to identify and reward teams for their superior performance in this way.

Expansion Strategy

Interneer will start by focusing on the initial stages of the product life cycle

Throughout the last decade, companies have spent a tremendous amount of resources to implement ERP systems in an effort to standardize and link multiple departments and suppliers within the Supply Chain. As a result of these complex and expensive systems, some companies were able to develop more efficient manufacturing and logistics processes as well as realize substantial cost savings. However, by focusing on the back end of the product life cycle, most of the costs of bringing a product to market have already been established. It has been estimated that 80% of the total costs of the entire product life cycle are determined in the product development stages. By focusing on the early stages, Interneer will deliver tremendous value to manufacturing and engineering firms by providing a complete product development solution that is affordable and easy to use. Interneer will help companies reduce costs, bureaucracy, and development time by offering an integrated suite of tools to improve efficiency and communications over the Internet

Interneer will provide a suite of value-added products and services

Once launched, Interneer will provide a suite of value-added products and services to mechanical engineering firms, concentrating on mechanical systems design and low-tech manufacturing. These products and services include: databases containing the most widely used engineering data, equations, industry reports/articles, and government regulations (retrieved via an intelligent and interactive search

engine); interactive problem solving tools and models; procurement and outsourcing resources; CAD / CAM / FEA server run applications; and career/educational resources. Once the systems and processes are established and successfully meets the needs of this target market, Interneer will leverage it's best practices, resources, and partnerships to expand its products and services to other areas of mechanical engineering ranging from power systems to acoustics/vibrations, spanning numerous industries.

Interneer will establish a business model for mechanical engineering then replicate for other disciplines

Interneer will use mechanical engineering firms as the test market to establish the business model and proof of concept. Once Interneer has acquired the necessary systems and processes, partnerships, resources, brand recognition, and client base, it will duplicate these product and service offerings to other engineering disciplines. By leveraging its expertise and proven product development model, Interneer can quickly replicate similar design solutions for civil engineering and aerospace firms. These two fields were chosen because of similarities in concepts and applications. This expansion strategy will continue in a similar fashion, extending product and service offerings into electrical engineering, chemical engineering, etc. As Interneer executes its expansion strategy, it will provide additional value to its clients as well as gain operational efficiencies at an exponential pace due to economies of scale and network externalities. After achieving critical mass, Interneer will establish itself as the premiere engineering portal, providing additional services to the engineering community that extends beyond the design process.

Interneer will provide value throughout the supply chain

As the provider of comprehensive design solutions, Interneer is strategically positioned to provide value throughout the supply chain, helping companies reduce the cost and time of bringing products to market. By integrating marketing, manufacturing, customer service/support, and all levels of suppliers into the design process, Interneer offers a platform that enables clients to implement mass customization and concurrent engineering techniques. By providing design engineers with direct input from marketing, they can design products based on real time market demand. Through information sharing among engineers within the firm and their suppliers, Interneer enables clients to design parts concurrently and interactively. Going beyond just design activities, Interneer incorporates manufacturing to simplify and improve the transition from product development to manufacturing. Incorporating manufacturing and supplier input into the process, Interneer enables engineers to design products using postponement and design for manufacturability concepts. In addition to manufacturing, Interneer will link customer service/support with design engineering. This two-way communication will provide post sale support with information to make their jobs easier as well as establish a feedback loop for continuously improving the product development process.

The Interneer software also provides the following functionality:

- Newsgroups in users' areas of expertise – allows for interaction amongst others in users' own communities and also throughout all communities – sometimes hosted by industry experts
- A directory of manufacturers/vendors with Icon information describing what the manufacturer website contains
- A directory of consultants/companies providing engineering services categorized and searchable by keywords
- The search also allows semantic searches
- Online job posting forms – ability to bid for services
- Online resumes – searchable
- Online contract request and bidding – ability to post contract requests online, timed and at a minimum initial bidding price – also ability to search for bids by engineering field or browse by category and bid online
- Mentor program for young engineers – make available screened mentors and provide them with questions from querying engineers – search mentors by categories and view experience
- Built-in FDA design control
- CE Mark certification guide
- Design for Manufacturing wizard
- CAD drawing analyzer for Manufacturability – Identify square inside edges, non-standard drill sizes, etc.
- PDA downloads
    - Screw selector
    - CAD viewer
    - Assembly drawings
    - Bill of materials
- Clickable-BOM to drill into design process for each part
- Engineering trivia
- Student competitions
- Teacher homepages for their students and homeworks online
- Connecting all the parts of an assembly together along with functional constraints for each so that if a change is made for one, it is propagated across the others and you can see the errors generated
- Studying behaviors of engineers and users on Interneer and gaining insights on how they work and conduct design to better serve them, in other words, data-mining
- Vendor catalog annotations and library of those annotations
- Design failure database – i.e., analysis of high-profile design flaws, and ways to avoid similar mistakes in the future
- Environmental impact analyzer – similar to the cost estimation function, but with environmental costs
- Lifecycle cost estimator – cost of design over time
- Standards alert – let's you know when a design or model does not comply with standards

parameters

- Document storage/linking – attach other types of documents to models
- ISO 9000 automatic tracking
- Project management
- Ability for managers to track their employee's use of and interaction with software
- Ability for managers to generate reports on how much knowledge their employees enter into the database and how useful the information is (measured by how many times others visit the information and the others' comments on it) – also more macro tracking of current state of company's knowledge resources
- Ability for companies to track their knowledge resources and to report areas of deficiency – automatic generation of new employee leads based on deficiencies – comparison to other companies competencies in similar industries
- Ability for users to submit information or processes to the entire Interneer community, and if accepted, possibility of including branding information near the submission for viewing by all Interneer users – thus ensuring organic/viral growth
- Ability to interact directly with other engineering software applications and to directly insert specified variables from Interneer's software into the additional software – for example automatic update of parameters in a CAD file with a simple click of a button on the Interneer site based on user's submitted values.

Content Development and Implementation

1. INTRODUCTION

Functional development and implementation for populating the Phenom software with engineering content are described in the following sections, including:

- Content Selection Criteria
- Content Structure
- Content Sources
- Risks

2. CONTENT

2.1 Content Selection Criteria

The overall strategy for content selection is an initial narrow focus on key areas with the focus expanding as our customer base, market and experience increase. Content selection is separated into three (3) phases. The three (3) phases coincide with software version releases, i.e. beta releases, version 1.0 and 1.5 releases and all future releases. This methodology for content selection has been chosen due to increasing user and task analysis information, copyright licensing issues and schedule limitations. Each phase is discussed below:

2.1.1 Phase 1

Phase 1 release(s) has sufficient content to sufficiently test usability. Content is broad enough to demonstrate the utility of the software and deep enough to have some limited use in an

engineering environment. Content selection for phase 1 is based on the following:

In-house expertise and "best guess" for first cut of content.
Preliminary user and task analysis results, i.e. surveys, interviews and focus groups.
Discussions with beta partners.
Copyright licensing of selected sources.
Content input schedule and resource limitations.

2.1.2 Phase 2

Augmented content that better reflects the needs of our beta partners, launch partners and users. Content is broad enough to cover primary markets and deep enough to be used on a daily basis in an engineering environment. Content selection for phase 2 is based on the following:

Beta site users input.
Continuing user and task analysis results.
Copyright licensing of selected sources.
Content input schedule and resource limitations

2.1.3 Phase 3 – Future Releases

Continued content expansion based on the evolving needs of users is the primary focus of Phase 3. Content is broad enough to cover primary and secondary markets and deep enough to provide comprehensive capabilities to the engineering community. Content selection for phase 3 is based on the following:

Customer/Beta site user input.
New and evolving markets.
New and evolving content, i.e. new books, technical papers, expert/author input, etc.
Copyright licensing of selected sources.

2.2 Content Sources

Content is obtained from several different sources, the most obvious is from technical books. Other sources are technical papers and journals, trade publications, vendors and original work. When used, every source is referenced and in particular the type of source, i.e. textbook, vendor data, trade journals, etc. This gives users the needed information to determine the level of caution required when using the selected information, e.g. an equation from a research paper should be used with greater caution than an equation from an established book.

2.3 Content Structure

The content is structured at a top level by modules, within each module there are classes, within each class there are sub-classes and finally equations, see Figure 4.

2.3.1 Modules

Currently twelve (12) Modules have been identified and proposed, this is referred to as the breadth of the content in section 2.1. Each module represents an area of engineering, i.e. Machine Design, Material Properties, Stress and Deflection, Heat Transfer, etc. Within each module specific subjects will be indexed. For example, under the machine design module specific subjects can be

Bolts, Screws and Fasteners, Pressure Vessels, Flanges & Brackets, etc. See Table 1.

2.3.2 Classes

Solution classes have been identified within each Module, this is referred to as the depth of the content in section 2.1. For example, under the Stress and Deflection module subject areas for Cantilever Beams, Simply Supported Beams may exist. See Table 1.

2.3.3 Cases

Within each class, specific case may be necessary. For example under Cantilever Beam Subject Areas a category for Load Types may exist.

2.3.4 Content

Content is defined as any data, mathematical or language. This can expanded to include graphs, tables, pictures and drawings.

Table 1. Module and Problem Class

Module	Problem Class
Machine Design	- Gaskets & seals - Bolts, screws & fasteners - Welded, brazed & soldered joints - Pressure vessels - Curved members - Gears, bearings, springs & shafts - Flexible elements
Stress & Deflection	- Bending - Buckling - Fatigue & fracture mechanics - Properties of cross sections - Non-linear problems - Dynamic & thermal effects - Advanced topics - Failure criteria
Material Properties	- Metals - Non-metals - Plastics - Composites - High temperature materials - Cryogenic materials - Out gassing of materials - Thermo-physical properties of fluids & gasses
Shock & Vibration	- Natural frequency - Mode shape - Shock & impact - Response to inputs - Mechanical impedance - Isolators

	- Random vibration
Heat Transfer	- Conduction - Convection - Radiation - Advanced topics
Fluid Mechanics	- Pipe & tube flow - Open channel flow - Turbulent flow - Flow over fins - Advanced topics
Applied Mechanics	- Friction - Velocity & acceleration - Inertia & momentum - Energy, power & work - Fluid at rest - Dynamics of rotation - Balance
Manufacturing	- Design for manufacturing - Design for assembly - Taguchi methods/SPC/DOE
Standards & Specifications	- Military/aerospace - Commercial - Test specifications - Design standards
Design Assurance & validation	- Design requirements - Drawing control - Specification/configuration control - Design methods, analysis and integration - Design reviews - Reliability and quality
Failure analysis	- Failure of materials - Failure analysis methodology
Rules of Thumb	- By industry - By product
Custom Modules	- Customer in-house design manuals & standards

2.4 Content Input Process and Quality Assurance

The content input process is a non-trivial matter and is identified as the 3rd greatest risk to content implementation success. The process blocks are explained below with the entire process flow shown in Figure 5.

Operation 1: Content Requirements Request

The content requirements request can come from any area of the organization. It is simply a request for new content, i.e. equations, references, material properties, etc.

Operation 2: Research Current Content Library

After a need has been identified the responsible engineer searches the current in-house library. This library will consist of sources that have been licensed or where permission has been given for usage.

Operation 3: Gate -

If the content exists within the in-house content library the sequence flows to the next operation. If the content does not exist then an alternative resource is researched and identified and a trade-off analysis is performed. The trade-off analysis takes into consideration the source of the content request and the overall effect on the product. In addition, the time, complexity and cost of obtaining a license agreement are considered.

Operation 4: Content Input Form

At this operation the responsible engineer fills in a form that indicates the content, reference(s), worked examples and any caveats, rules or limitations associated with the content. The information contained on the Content Input Form is the body behind the on-line content, see Appendix A.

Operation 5: Gate – New Content Review and Sign-off

Results from the trade-off analysis and the content input form are reviewed and approved or rejected at this operation. The reviewers are composed of representatives from engineering, software, marketing and operations. Three (3) outcomes are possible; accept, redo or cancel. In each case the reason for the decision are made clear and recorded on the Content Input Form.

Operation 6: New Content Input

The actual content is input into electronic format at this operation. If the content is language or tables this operation may be outsourced. A software input program is used to facilitate input speed and accuracy.

Operation 7: Gate – Level 1 Quality Check

This operation edits content for accuracy and completeness. In the case of an equation, this is the first time it is "exercised" utilizing worked examples provided on the Content Input Form. If it passes the level 1 check it will flow to the level 2 check. If it does not pass the level 1 check, it will be corrected and re-input.

Operation 8: Gate – Level 2 Quality Check

This is a system level final functional check to ensure that new content operates with all other parts of the software and is fully functional.

Operation 9: Gate – Final Review and Sign-off

This operation is the final review prior to release to software integration. This review takes into consideration data and results from all previous gates. The reviewers are composed of representatives from engineering and software. The three (3) possible outcomes are; redo, cancel or pass. If the new content passes this operation it is released to software integration for release. In each case the reason for the decision is made clear and recorded on the Content Input Form.

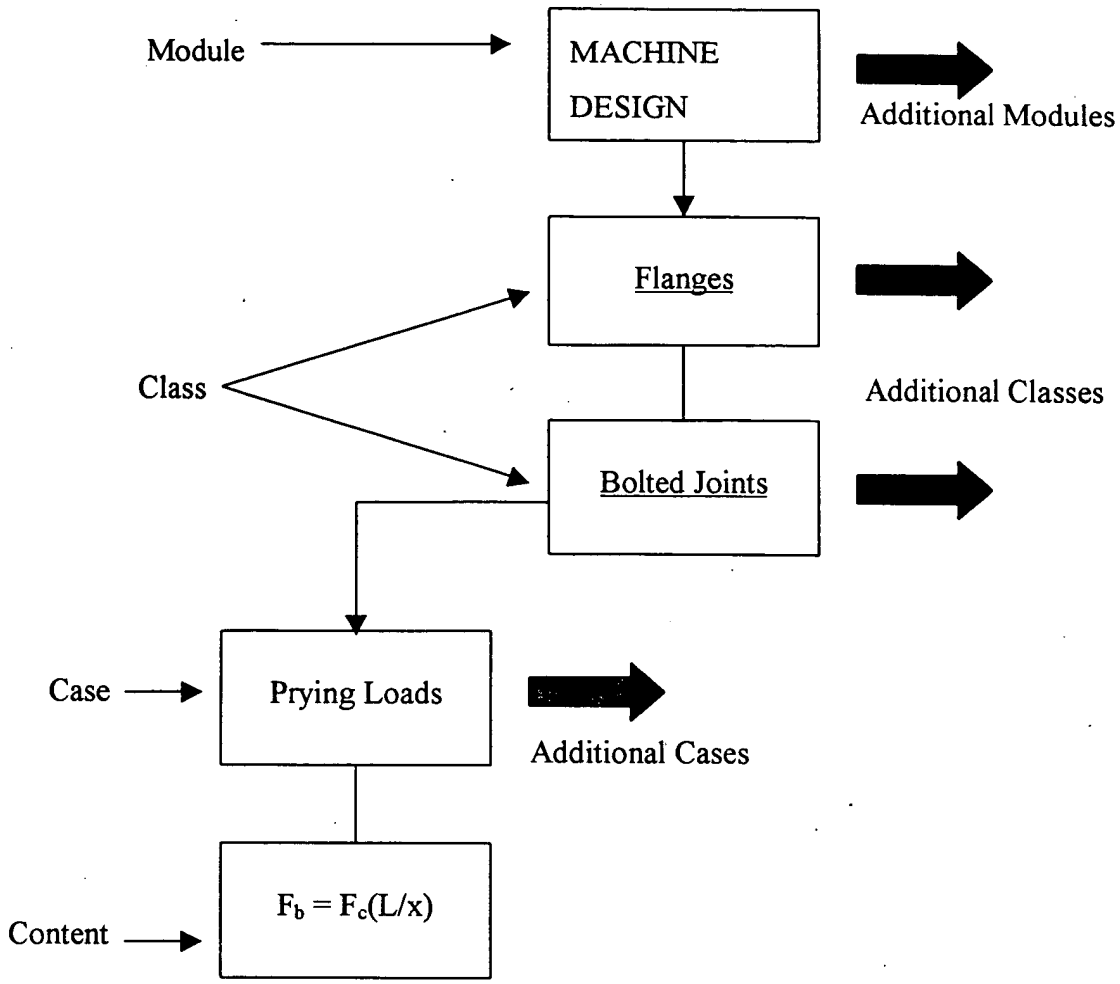


Figure 4. Content Structure

3. RESOURCE REQUIREMENTS

3.1 Tools

As mentioned in section 2.4, Operation 6 – New Content Input, software that facilitates the input process is required. This software will reduce the level of personnel required for fast and accurate input. This is an in-house project with the resultant software an integral part of the "key competence" of Interneer.

3.2 Staffing

3.2.1 Responsibilities and Requirements

Principal Engineer, *module name* – This position is responsible for the content, editing, research

and upkeep of each module. They interface with all levels of the company as well as customers. The person in this position *must keep current with developments within their field of expertise.* One (1) or more principal engineers are assigned to each module, depending on the module content depth. This is a senior level engineering position with at least ten (10) years of industry experience, they should be considered an expert in their field.

Engineering Editor – This position is responsible for the input of content. They interface with all levels of the company and may have some customer interface. This position is not assigned to a specific module or principal engineer, but is a "rover" and is allocated where resources are needed. This is a junior to middle engineering position with some industry experience, they must be detailed oriented and flexible.

Technical Editor – This is an itinerant position composed of primarily student engineers. They work under the supervision of the technical copywriters and/or the technical editors. They are of at least junior level standing in one (1) of the engineering disciplines, mathematics, physics or other comparable majors.

4. RISKS

4.1 Usability

Usability is classified as a risk because if the content is not usable implementation will not be successful. The usability will depend greatly on our recruitment and handling of beta partners as well as the user and task analysis efforts. In addition, our interpretation of this data will be crucial to the proper content mix.

4.2 Content Input

Due to the large amount of information that needs to be put into electronic format, content input is classified as a risk. Content input is a complete plan in and of itself, it will require manpower estimates, process and procedures, software suite specifically for content input and quality procedures..

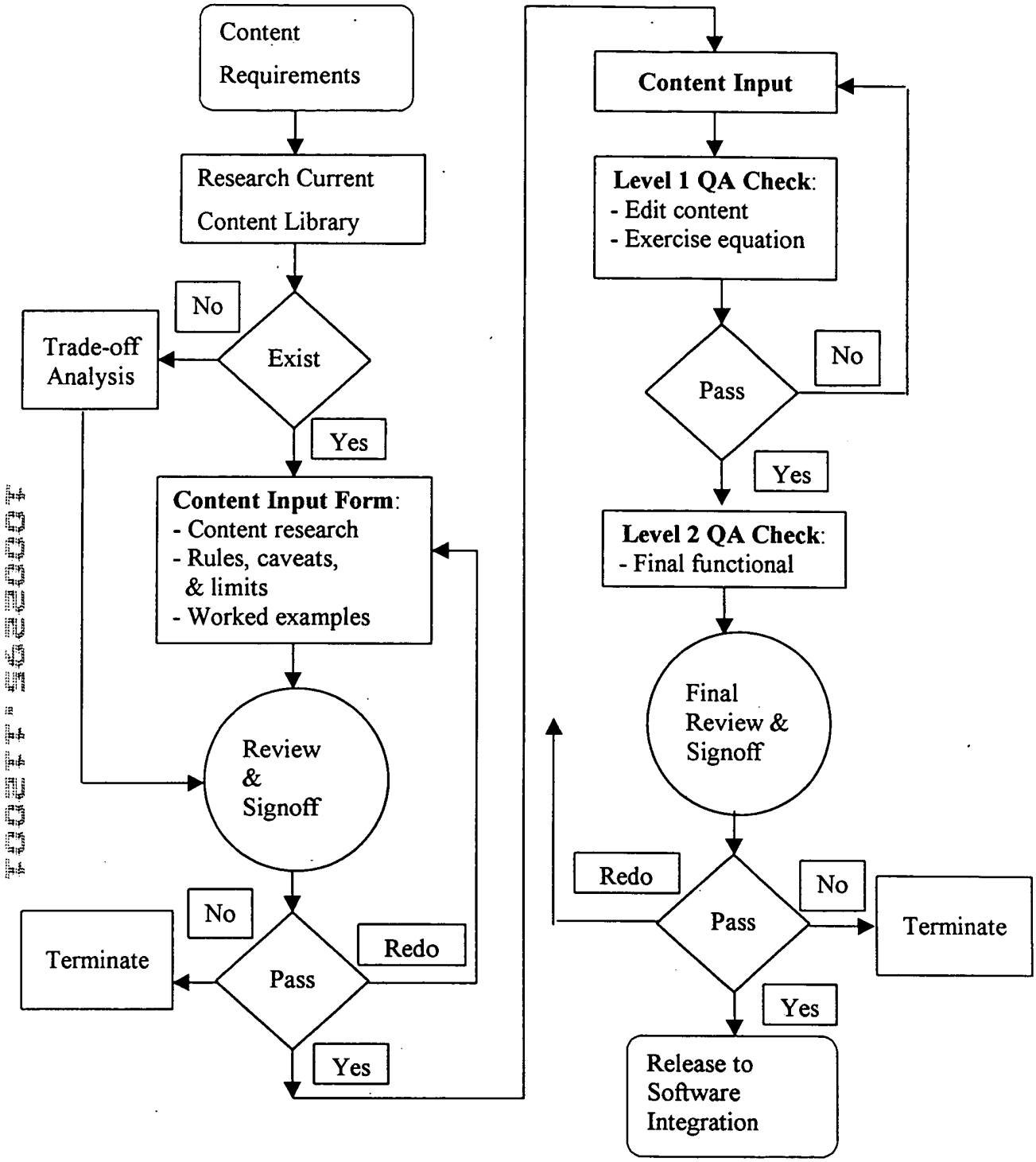


Figure 5. Content Input Process Flow

Appendix A

Content Input Form **Document Number XXXXXX**

Revision XX

PRINCIPAL ENGINEER: *COGNIZANT ENGINEER.*	**DATE:**
REQUESTOR: CAN BE ANY SOURCE, INTERNAL OR CUSTOMER.	**DATE: REQUEST DATE**
Requirement(s): *What is required to add information, solve a problem including features and end results.*	
Source(s): *Content source or sources including: source title, edition or version, year, author(s), page and/or equation number, publisher and source type.*	
Module: **Case:** **Class:**	
Layout: *Sketch of layout as it will appear on screen including free body diagram, content explanation, content, limitation, charts, tables, etc.*	
Content: *Content as it will appear on screen. This will be input verbatim.*	
Content Explanation: *Explanation of content as it will appear on screen. This will be input word for word.*	
Content Limitations: *Limitations of content as it will appear on screen. This will be input word for word.*	
Content Links/Dependencies: *Links and dependencies associated with the content.*	
WORKED EXAMPLES: ***WORKED EXAMPLES FOR*** **QUALITY CONTROL OF PRODUCT.**	

Signoffs

Name	Date	Role